1. Cardiac laser surgery apparatus comprising

a CO_2 slab laser, and

a laser delivery system for delivering laser pulses from said laser to a patient's heart.

2. The apparatus of claim 1 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart to provide openings in the patient's heart for myocardial revascularization.

3. The apparatus of claim 1 wherein said pulses are shorter than 100 ms and provide energy of between 8 and 80 Joules per pulse.

4. The apparatus of claim 1 wherein said laser delivery system is synchronized to the heart beat to fire when the heart is electrically insensitive to reduce the chanceofarrhythmia.

5. The apparatus of claim 4 wherein said laser starts firing on the R wave and stops before the T wave.

6. A method of cardiac laser surgery comprising

operating a CO_2 slab laser to output laser pulses, and

delivering said laser pulses to a patient's heart.

7. The method of claim 6 wherein said delivering provides openings in the patient's heart for myocardial revascularization.

8. The method of claim 6 wherein said pulses are shorter than 100 ms and provide energy of between 8 and 80 Joules per pulse.

9. The method of claim 6 wherein said laser delivery system is synchronized to the heart beat to fire when the heart is electrically insensitive to reduce the chanceofarrhythmia.

10. The method of claim 9 wherein said laser starts firing on the R wave and stops before the T wave.

11. A laser assembly comprising

an elongated housing defining a laser cavity having first and second ends, and an opening at said first end,

a mirror located inside of said housing at said first end,

a plate that is located outside of said housing,

adjustable connectors adjustably connecting said plate to said first end at connector locations outside of said opening so as to adjust the angular orientation of said plate with respect to said housing,

a support member having one end connected to said plate, another end carrying said mirror, and an intermediate portion passing through said opening, and

a metal bellows structure surrounding said support member and having one end that is sealed to said first end of said housing around said opening and another end that is sealed to said plate around said intermediate portion and inside of said connector locations so as to provide a vacuum-tight seal between said housing and said plate around said opening,

whereby the angular orientation of said mirror with respect to said housing can be adjusted by adjusting said adjustable connectors to adjust the orientation of said plate.

12. The assembly of claim 11 wherein there are two said adjustable connectors and a third connector connecting said plate to said end of said housing.

13. The assembly of claim 11 wherein said adjustable connectors have screw threads to adjust the distance between said plate and said end of said housing at said respective connector locations.

14. The assembly of claim 11 further comprising slab electrodes within said housing, said electrodes being spaced from each other by a gap that is aligned with said mirror.

15. The assembly of claim 14 further comprising a second mirror at the other end of said housing, said second mirror being aligned with said gap.

16. The assembly of claim 14 further comprising a bracket that is secured to said end of said housing and supports said electrodes.

17. Myocardial revascularization apparatus comprising the laser assembly of claim 11 and a laser delivery system for delivering laser pulses to a patient's heart to provide openings in the patient's heart.

18. The apparatus of claim 17 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart.

19. A laser assembly comprising

an elongated housing defining a laser cavity having first and second ends, and openings at said first end,

a mirror located inside of said housing at said first end, and

adjustment devices that are sealably connected at said openings, said adjustment devices adjustably positioning said mirror with respect to said first end so as to adjust the angular orientation of said mirror with respect to said housing, said adjustment devices having engagement portions accessible outside of said first end.

20. The assembly of claim 19 wherein each said adjustment device includes a rotary motion feedthrough device sealably connected in a respective said opening and a screw thread device that is connected to be rotated by said rotary motion feedthrough device so as to adjust the position of said mirror with rotation of said screw thread device.

21. The assembly of claim 19 wherein one said adjustment device adjusts the orientation with respect to a first axis, and another said adjustment device adjusts the orientation with respect to a second axis that is perpendicular to said first axis.

22. The assembly of claim 19 further comprising slab electrodes within said housing, said electrodes being spaced from each other by a gap that is aligned with said mirror.

23. The assembly of claim 22 further comprising a second mirror at the other end of said housing, said second mirror being aligned with said gap.

24. The assembly of claim 22 further comprising a bracket that is secured to said housing and supports said electrodes.

25. Myocardial revascularization apparatus comprising the laser assembly of claim 19 and a laser delivery system for delivering laser pulses to a patient's heart to provide openings in the patient's heart.

26. The apparatus of claim 25 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart.

27. A method of operating a laser comprising

providing a laser and an RF power supply for said laser,

preionizing a laser using RF voltage pulses provided by an RF power supply, and

after said laser has been preionized, firing said laser using said RF power supply to provide an output laser pulse of longer duration than said RF voltage pulses.

28. The method of claim 27 wherein said RF voltage pulses have a low duty cycle during said preionizing step.

29. The method of claim 27, further comprising delivering said laser pulses to a patient's heart.

30. Laser apparatus comprising

a laser housing having laser electrodes, mirrors and a laser gas therein,

an RF power supply connected to supply RF voltage pulses to said electrodes, and

a control circuit that controls said RF power supply to preionize said laser gas by supplying RF voltage pulses provided by said RF power supply, and to fire said laser by providing RF voltage pulses of longer duration than said RF voltage pulses.

31. The laser apparatus of claim 30 wherein said RF power supply includes an amplifier that provides output pulses, an RF source, and a switch that connects said RF source to an input of said amplifier.

32. The system of claim 30 wherein said laser apparatus delivers 800 watts.

33. The system of claim 30 wherein said laser gas is a mixture of carbon dioxide, helium, nitrogen, and xenon.

34. Myocardial revascularization apparatus comprising the laser apparatus of claim 30 and a laser delivery system for delivering laser pulses to a patient's heart to provide openings in the patient's heart.

35. The apparatus of claim 34 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart.

36. Laser apparatus comprising

a housing made of a metal extrusion having a uniform cross-section and defining an elongated laser chamber therein extending along a longitudinal axis,

said housing having a structure extending outward from one side of said housing and linearly along said housing parallel to said longitudinal axis,

laser focusing optics mounted on said structure along an optical axis that is parallel to said longitudinal axis, and

laser directing elements directing a laser beam generated in said chamber to said focusing optics.

37. Myocardial revascularization apparatus comprising the laser apparatus of claim 36 and a laser delivery system for delivering laser pulses to a patient's heart to provide openings in the patient's heart.

38. The apparatus of claim 37 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart.

39. Laser apparatus comprising

a slab laser beam generator generating a rectangular laser beam having a width dimension and a thickness dimension, and

a plurality of optical elements receiving said rectangular laser beam and converting it to a square laser beam of the desired dimensions.

40. The laser apparatus of claim 39 wherein said rectangular laser beam is 2 mm by 10 mm, and wherein said square laser beam is 9.5 mm by 9.5 mm.

41. The laser apparatus of claim 39 wherein said optical elements include a first cylindrical lens to expand said beam in said thickness dimension to an expanded beam and a second cylindrical lens to collimate the expanded beam from the first cylindrical lens.

42. The laser apparatus of claim 41 wherein said optical elements further include a spatial filter.

43. The laser apparatus of claim 42 wherein said spatial filter includes a third focusing lens and a fourth focusing lens and a slit between said third focusing lens and said fourth focusing lens.

44. The laser apparatus of claim 43 further comprising a shutter between said third focusing lens and set fourth focusing lens.

45. The laser apparatus of claim 41 wherein said first cylindrical lens is a negative lens, and said second cylindrical lens is a positive lens.

46. Myocardial revascularization apparatus comprising the laser apparatus of claim 39 and a laser delivery system for delivering laser pulses to a patient's heart to provide openings in the patient's heart.

47. The apparatus of claim 46 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart.

48. A slab laser comprising

a pair of elongated spaced apart electrodes having opposed planar surfaces defining a discharge region between said opposed planar surfaces, said electrodes having aligned side surfaces extending along a longitudinal axis thereof, and

a plurality of nonconductive spacers each connecting one said electrode to the other said electrode at said side surfaces and being spaced from adjacent spacers along said side surfaces,

said spacers having relieved portions facing said discharge region between first and second planes passing through said planar surfaces, said relieved portions including at least one projecting portion extending toward said discharge region and having an apex closer to said discharge region than adjacent portions of said relieved portions.

49. The laser of claim 48 wherein there is a third plane including said side surfaces and wherein said apex is on the side of said third plane outside of said discharge region and is spaced from said third plane.

50. The laser of claim 48 wherein each said spacer has at least two said projecting portions extending toward said discharge region and having an apex region.

51. The laser of claim 48 wherein said apex converges to a line.

52. Myocardial revascularization apparatus comprising the laser of claim 48 and a laser delivery system for delivering laser pulses to a patient's heart to provide openings in the patient's heart.

53. The apparatus of claim 52 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart.

54. A slab laser comprising

a pair of elongated spaced apart electrodes having opposed planar surfaces defining a discharge region between said opposed planar surfaces, said electrodes having aligned side surfaces extending along a longitudinal axis thereof,

a plurality of nonconductive spacers each connecting one said electrode to the other said electrode at said side surfaces and being spaced from adjacent spacers along said side surfaces,

a plurality of barbed inserts in said side surfaces and spaced from adjacent barbed inserts along said surfaces, and

a plurality of inductors that each have one end inserted into a said barbed insert on one electrode and another end inserted into a said barbed insert on another electrode.

55. Myocardial revascularization apparatus comprising the laser of claim 54 and a laser delivery system for delivering laser pulses to a patient's heart to provide openings in the patient's heart.

56. The apparatus of claim 55 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart.

57. A slab laser comprising

an elongated housing having an internal ledge structure along at least one side,

a pair of elongated spaced apart electrodes having opposed planar surfaces defining a discharge region between said opposed planar surfaces, and

a plurality of resilient contact elements extending along a bottom of a said electrode and supported on said internal ledge structure to provide good electrical connection between said electrode and said housing.

58. The slab laser of claim 57 wherein said electrodes have aligned side surfaces extending along a longitudinal axis of said housing, and a further comprising a plurality of nonconductive spacers each connecting one said electrode to the other said electrodes at said side surfaces and being spaced from adjacent spacers along said side surfaces.

59. Myocardial revascularization apparatus comprising the laser of claim 57 and a laser delivery system for delivering laser pulses to a patient's heart to provide openings in the patient's heart.

60. The apparatus of claim 59 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart.

61. Laser apparatus comprising

a housing defining an elongated laser chamber therein extending along a longitudinal axis,

a frame having support portions supporting said housing, and

isolation mounts between said support portions and said housing.

62. The apparatus of claim 61 further comprising wheels attached to said frame.

63. The apparatus of claim 61 wherein said bumpers include a vertically oriented bumper and a horizontally oriented bumper.

64. The apparatus of claim 61 wherein said bumpers include two vertically oriented bumpers and two horizontally oriented bumpers.

65. The apparatus of claim 61 wherein said housing is the housing of a slab laser.

66. The apparatus of claim 61 further comprising a laser delivery system for delivering laser pulses to a patient's heart.

67. The apparatus of claim 66 wherein said laser delivery system includes a hand piece for delivering pulses to the outside of a patient's heart to provide openings in the patient's heart.

68. The apparatus of claim 67 wherein said laser delivery system includes an articulated arm that has one end that is supported by said housing, and another end that carries said hand piece.

69. Myocardial revascularization apparatus comprising

a laser,

a laser delivery system for delivering laser pulses from a hand piece to a patient's heart,

an air source including a compressor and an air filter, and

a tube connected to said laser delivery system to deliver purge air from said source to said hand piece to clear smoke from the inside of said hand piece.

70. The apparatus of claim 69 wherein said laser delivery system includes an articulated arm that has one end that is supported by said laser, and another end that carries said hand piece, and wherein said arm carries said tube.

71. Laser apparatus comprising

a housing defining an elongated laser chamber therein extending along a longitudinal axis,

a support supporting said housing with said axis aligned substantially with a vertical axis,

said housing having a laser output window at the lower end of said housing, and

said housing having an upwardly extending lip around said window to limit collection of particles on said window.